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SESSION ID: CTF-T01

Advanced Exploit Writing, Hunting, and Defense CTF

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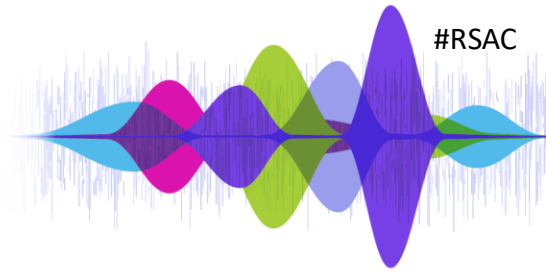

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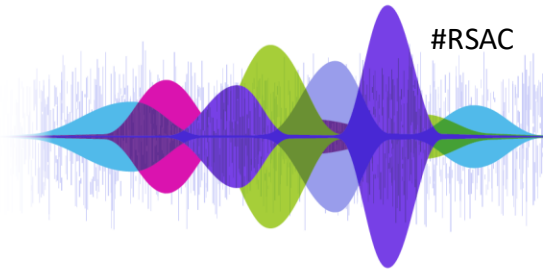


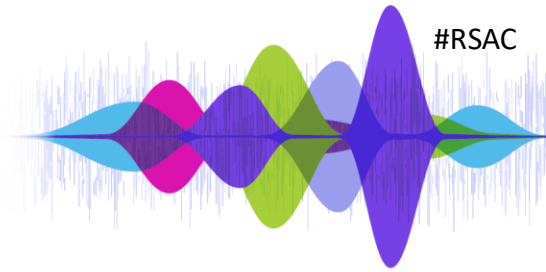
Objectives

- Use ElasticSearch to perform exploit hunting
- Rewrite the exploit (Threat Emulation) to use against your opponents and score points
- Secure the system against exploits using Consensus-Based Defense
- Test the security of your new system

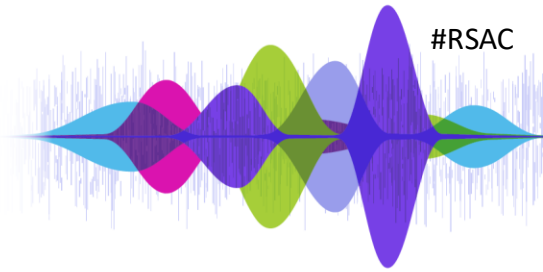
Connect to your instance

- Example: ssh student@[ip address]

And the winners are…



Live Solution Demonstration



- Step 1: Finding the Exploit
  - In ElasticSearch, search for instances where the HTTP response from the primary and secondary server mismatch
- Step 2: Rewriting the Exploit
- Step 3: Defense
  - Identify the IP addresses and the ports of the primary and secondary server
  - Restart the server

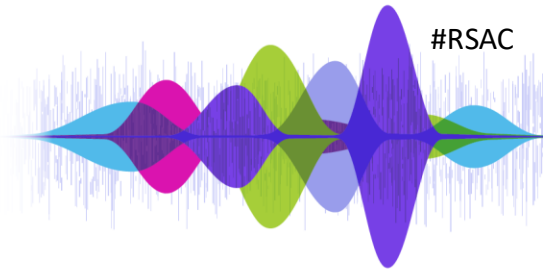
Summary

- In simple or complex programs, you can bypass state-of-the-art exploit mitigations including ASLR, DEP/NX, and Stack Cookies (as you just did!)
- Layering exploit mitigations makes an attacker's job a bit harder, but:
- **Consensus-Based Defense makes an attacker's job exponentially harder** as they require one attack to work simultaneously and identically on: 2 different memory layouts, OSes, processors, and exploit mitigations

Apply

- Within 1 week:
  - Identify which webservers can access private or critical information or systems
- Within 1 month:
  - Identify & Test a Consensus-Based Defense solution for each of these webservers
- Within 2 months:
  - Deploy the Consensus-Based Defense solution in Permissive mode, and see if there are any unintentional mismatches
- Within 3 months:
  - Set the Consensus-Based Defense solution into Enforcing mode
- Within 6 months:
  - Identify and test alternate runtime and compile-time exploit mitigations for use on two or more of the backend servers
  - Implement those exploit mitigations
- Within one year:
  - Update processes in use for webserver deployment to include a Consensus-Based Defense solution from the start

Further Reading and Practice



- Consensus Based Defense: youtu.be/YAGmZv11xvU *
- Exploit Development:
  - A “Crash” Course in Buffer Overflows: youtu.be/0xlqpB07GHo *
  - Gray Hat Hacking, 6th Edition, by Stephen Sims et. al *
  - Modern Binary Exploitation: https://github.com/RPISEC/MBE

* Also by this presenter

* Available in Conference Bookstore while supplies last

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